



NYSEARCH

Third Party Damage Prevention Programs



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NYSEARCH Members/Associate Members

- ◆ CHG & E
- ◆ Con Ed
- ◆ Corning
- ◆ Keyspan (NY)
- ◆ National Fuel Gas
- ◆ Niagara Mohawk
- ◆ NYSEG
- ◆ O & R
- ◆ RG & E
- ◆ St. Lawrence
- ◆ Enbridge Consumers Gas
- ◆ BG & E
- ◆ PSE&G
- ◆ PECO Energy
- ◆ Questar
- ◆ Washington Gas Light
- ◆ Yankee Gas



Background

- ◆ NYSEARCH members identified third party damage prevention as a high priority to address through R & D
- ◆ NYSEARCH worked with NYGAS Damage Prevention Working Group and developed RFP
- ◆ To address the objectives, four projects selected throughout the last three years
- ◆ OPS/DOT has been very supportive of this area and has awarded cofunding dollars to support this effort
- ◆ Additional initiatives are being considered by NYSEARCH



Benefits

- ◆ Active monitoring of Third Party Damage
 - Prevent hits and notify before they occur
 - Early detection and opportunity to locate gas leaks
- ◆ Reduce cost of operations associated with repairs to damaged pipe; reduce long-range liability
- ◆ Reduce customer downtime
- ◆ Improve Safety & Pipeline Integrity



Evaluation of Near Commercial Fiber Optic Approach

- ◆ Developer: FFT – Secure Pipe™ Monitoring System
- ◆ Operation
 - System uses standard fiber optic cable buried above pipe (approx 12” below surface)
 - Light travels along fiber & is altered by vibration, compression, acoustics, strain-stress
 - Alteration is evident in change in signal
 - Amplitude, phase, wavelength, time-of-flight

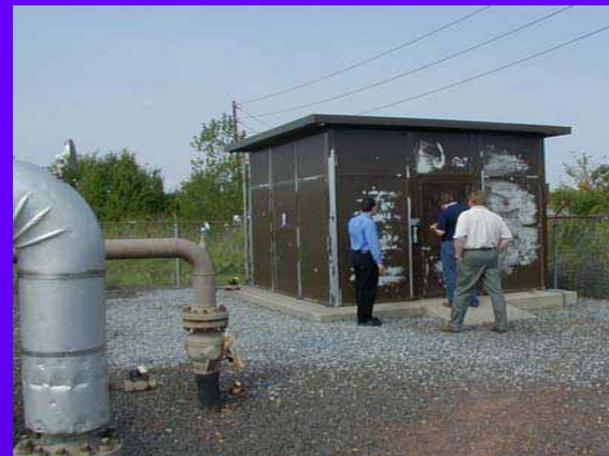


Secure Pipe™ Characteristics

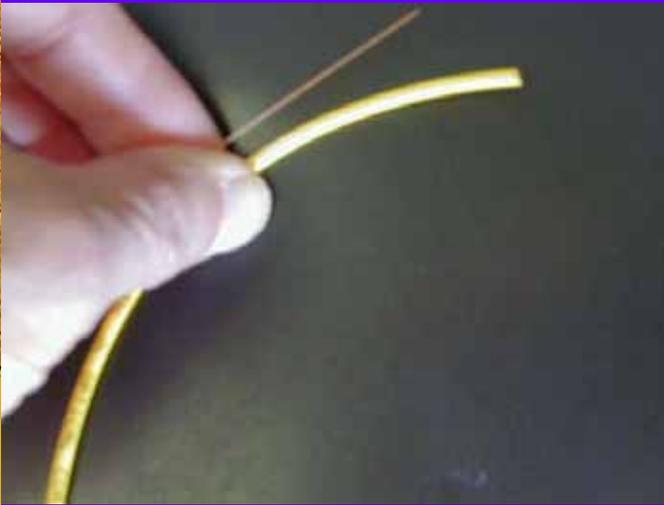
- ◆ Sensing can take place over continuous length and up to 30 miles with one control system (over 200 miles with repeaters to amplify optical signal)
- ◆ Sensing and locating is in real-time
 - Milliseconds delay in processing
 - Location pinpointed to +/- 10 feet
- ◆ Can monitor static and dynamic events
- ◆ Breaks in fiber shut down system
- ◆ Claims 99% detection rate, <1% false alarm rate
- ◆ Monitors on a continuous basis and therefore can proactively warn about encroachment activity

PSEG Field Test

- ◆ Fiber optic cable direct buried 18" deep
- ◆ Pipe is 12" wrapped steel operating at 475 psi with depths ranging 3' – 5'
- ◆ Site diversity
 - Waterway & marsh land
 - Adjacent to and under RR
 - Under two paved roadways
 - Residential areas
 - Some hilly and rough terrains



Scenes from PSEG Field Test of FFT Secure Pipe™ Technology



Scenes from Questar Field Test



- ◆ Salt Lake City area
 - Mostly sandy, rocky,
 - hilly terrain
 - Extensive
 - construction in area
 - (sewer, water,
 - roadways, curbs)



- ◆ Pipeline
 - 20" wrapped steel
 - MAOP 600 psi
 - Burial depth is 3 to 6 feet
 - Length – 3.2 miles
- ◆ Install cost - \$1.50/ft

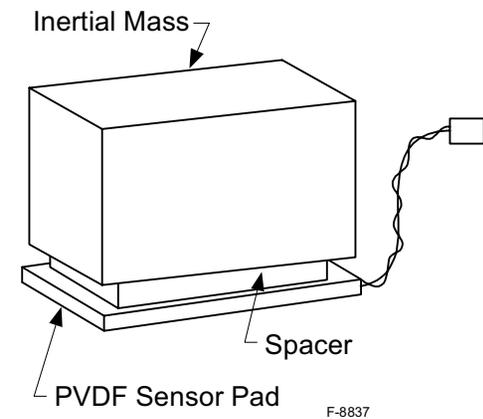
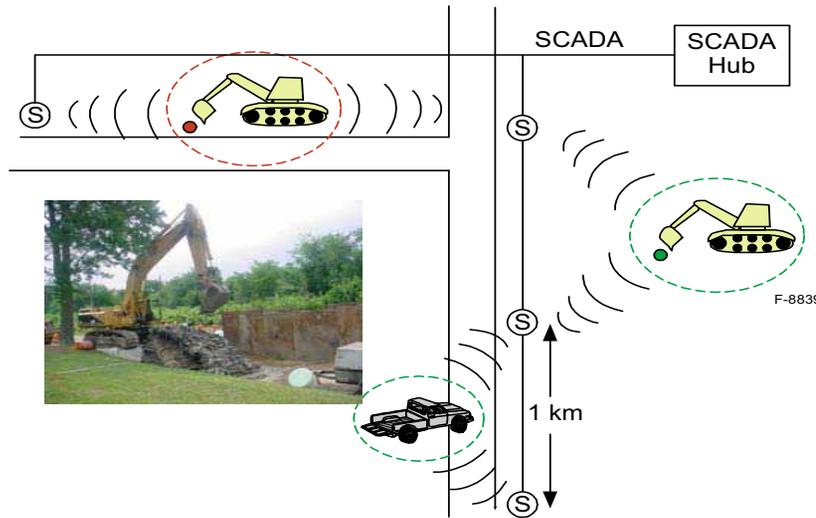




Infrasound Sensors for Monitoring Third Party Damage

- ◆ **Objective:** Develop a distributed network of infrasound point sensors deployed over a wide area (and not in close proximity to the pipelines) and able to detect potential intrusion and/or third party damage
- ◆ **Contractor:** Physical Sciences Inc. (PSI)
- ◆ **Cofunded by DOT/OPS**
- ◆ **Workscope:** Completed Proof-of-Concept and Initial Design; Experimental Prototypes are being developed completed and Field Testing will be conducted in '05

Infrasound Sensors – PIGPEN Concept



- Smart Sensors placed at 0.5 to 1 km spacing along the pipeline
- PIGPEN system determines range and direction of potential threats
- PIGPEN sensors determine threat status based on signature (backhoe or bus)
- Only true threats that are close to the pipe trigger a warning

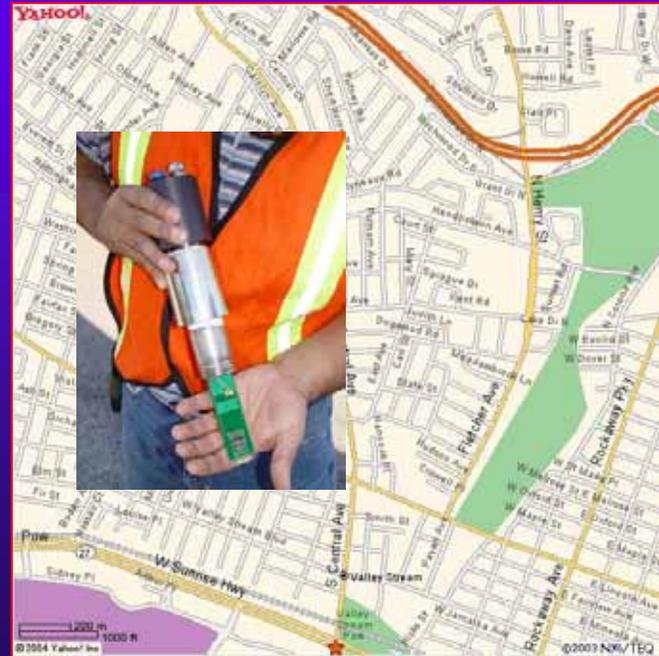
Infrasound Sensors for Monitoring Third Party Damage - PIGPEN

- ◆ **Results:** Feasibility study and first series of field tests showed positive results
- ◆ **Status:** System design and planning for system field test underway



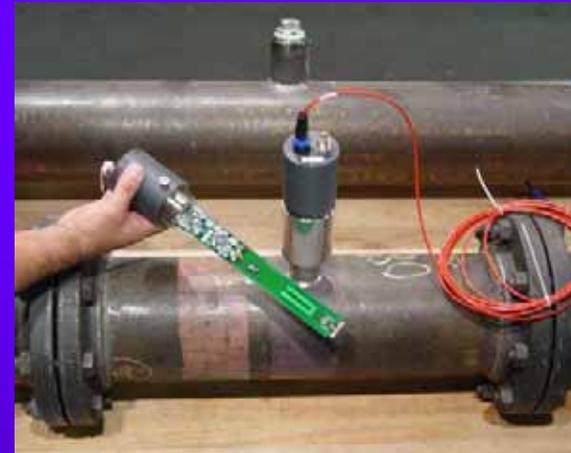
GASNET Distributed Sensor Network

- ◆ **Objective:** Develop a wireless, real-time distribution network monitoring system using a multitude of sensors
- ◆ **Workscope:** Design prototype system; prove concept in lab and field; develop pre-commercial system



GASNET Distributed Sensor Network

- ◆ **Results:** Proved concept of wireless in-pipe network of sensors in the lab and in the field
- ◆ **Status:** Alpha-prototype system proven viable; proceeding with design, construction and testing of pre-commercial system



Handheld Pipe Locator

- ◆ Objective: To develop a portable and low cost locating tool that can be used to find all underground facilities, including plastic, and widely distributed among contractors and utility operators
- ◆ Benefits: Reduce third party damage and associated safety incidents, reduce costs associated with test pitting prior to new construction and downtime, improve construction planning



Handheld Pipe Locator - Status

- ◆ First prototype field tests in Fall '03
 - Prototypes performed as good or better than commercial tools
- ◆ Free scanning was possible and weight was acceptable
 - Operators provided input on ergonomics and on method of operation
- ◆ Monostatic design scope approved and near complete – ensures FCC compliance and reduces weight
- ◆ Working with commercial partner to transfer technology and commercialize

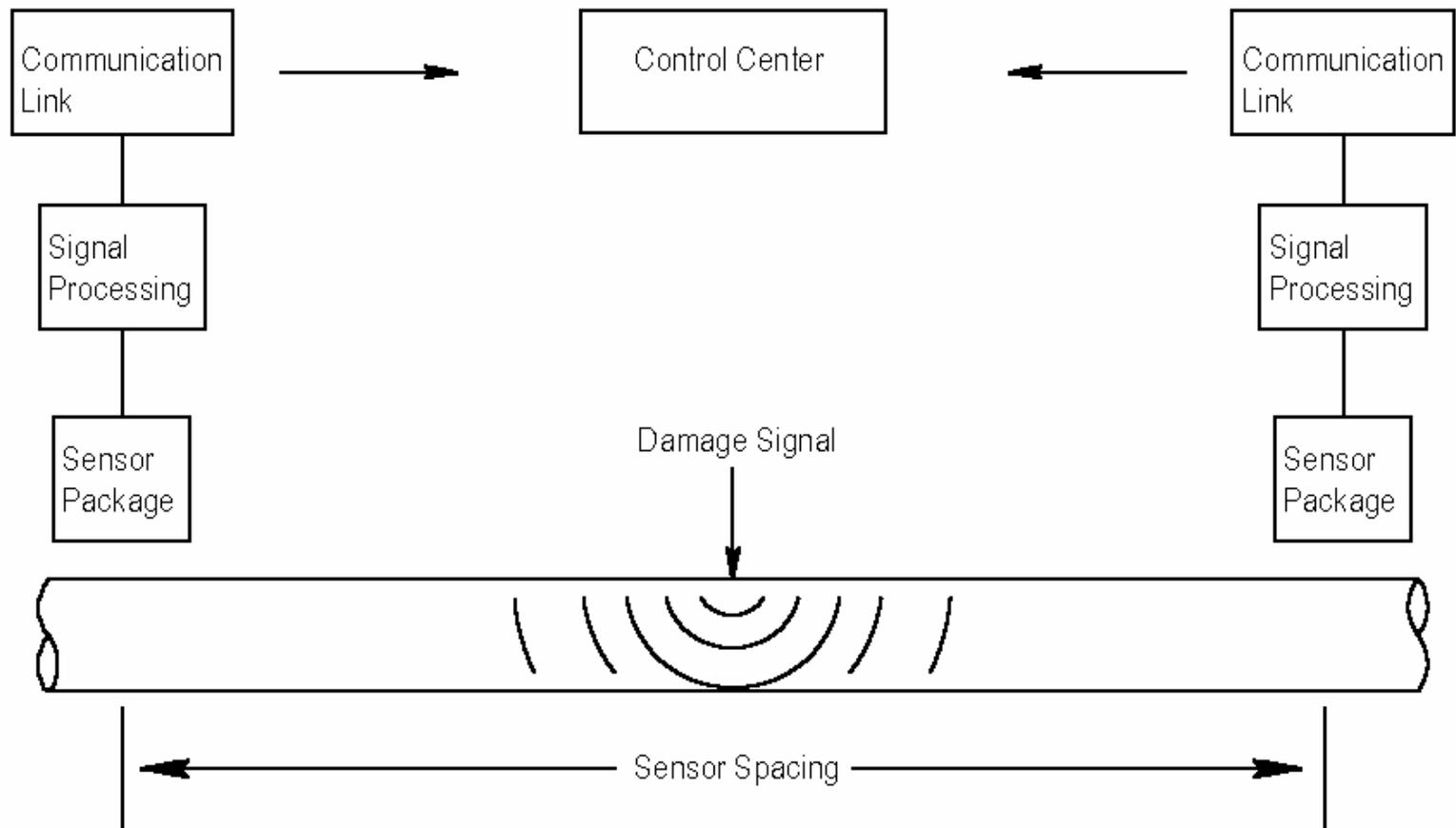




GTI/Battelle Acoustic Monitoring Project

- ◆ Mount accelerometers on surface of pipe; space at large distances
- ◆ Wireless or hard wire communication from control box to central station
- ◆ Ongoing development of signal processing to distinguish different sounds and environmental noise
- ◆ NYSEARCH participating as one of several parties doing system field tests of advanced generation

GTI/Battelle Acoustic Monitoring Project



Acoustic Monitoring Field Installation in NJ - Earlier Generation



Courtesy: PSEG





GTI/Battelle Acoustic Monitoring Project

◆ Status

- Battelle received approval from GTI and project team for advanced design
- GTI now working with several utilities to set up field test
- NYSEARCH field test at one site but two sites will be evaluated and compared as candidates
- Field testing on advanced generation to begin in 2005



Summary

- ◆ Third party damage prevention is a high priority for the NYSEARCH organization
- ◆ Several projects are underway; some in advanced stages of development, others in early stages
- ◆ DOT/OPS is supportive of this area of work
- ◆ More innovative technologies for third party damage prevention can/should be explored